

EP

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/810,416	CHEN, LU	
	<b>Examiner</b>	<b>Art Unit</b>	
	Dean O. Takaoka	2817	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Applicant's amendment dated November 24, 2006.
2. ☒ The allowed claim(s) is/are 1-6, 9-11 and 13-25.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |                                                                                                            |                                                                                                             |
|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)                                           | 5. <input type="checkbox"/> Notice of Informal Patent Application                                           |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date <u>1/17/07</u> . |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br>Paper No./Mail Date _____    | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                                         |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance                        |
|                                                                                                            | 9. <input type="checkbox"/> Other _____.                                                                    |

### EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Siegmar Silber on January 17, 2007.

In the claims, amend claims 1, 2, 10 and 19.

1. (Currently amended) A directional coupler comprising:

- a) a first circuit line having a first end and a second end;
- b) an input port connected to the first end and an output port connected to the second end;
- c) a second circuit line having a third end and a fourth end, the first and second circuit lines located proximate to each other such that they are electromagnetically coupled;
- d) a forward coupled port connected to the third end and a reverse coupled port connected to the fourth end;
- e) a first low pass filter having a constant impedance, said first low pass filter connected to the forward coupled port, said first low pass filter shifting the operating frequency of the directional coupler to a lower frequency and thereby maintaining a predetermined return loss, said low pass filter having a filter response to flatten the coupling response outside of the usable band of the coupler.

2. (Currently amended) The directional coupler according to claim 1, wherein the first

low pass filter comprises:

a first resistor having a first and second end, the first end of the first resistor connected to the forward coupled port;

a second resistor having a third and fourth end, the third end of the second resistor connected to the third end of the second circuit line;

[an optional] a third resistor connected in parallel with and in the same manner as said second resistor, said third resistor utilized, when required, by power levels,

a first capacitor having one end connected to the second end of the first resistor and the fourth end of the second resistor, the other end of the first capacitor connected

10. (Currently amended) A directional coupler comprising:

a) a multi-layered substrate, the substrate having an upper surface and a lower surface;

b) a first circuit line located within the substrate on a first layer and having a first and second end, the first end connected to an input port and the second end connected to an output port;

c) a second circuit line located within the substrate on a second layer and having a third and fourth end, the fourth end connected to a reverse coupled port;

d) a first, second, third and fourth terminal located on the lower surface;

e) a first via extending between the first terminal and the first end;

f) a second via extending between the second terminal and the second end;

- g) a third via extending between the third terminal and the third end;
- h) a fourth via extending between the fourth terminal and the second end; and
- i) a first low pass filter connected between the third end and a forward coupled port, said first low pass filter shifting the operating frequency of said directional coupler to a lower frequency, said low pass filter having a filter response to flatten the coupling response outside of the usable band of the coupler, in turn, comprising: a first inductor connected between the forward coupled port and the third port.

19. (Currently amended) A directional coupler comprising:

- a) a printed circuit board, having an input port, an output port and a forward coupled port;
- b) a substrate mounted to the printed circuit board, the substrate having a plurality of layers and an upper surface and a lower surface;
- c) a first and second coupled circuit line located within the substrate on different layers, the first circuit line having a first and second end, the first end connected to the input port and the second end connected to the output port, the second circuit line having a third and fourth end, the fourth end connected to a termination; and
- d) a first low pass filter mounted to the printed circuit board and connected between the third end and the forward coupled port, said first low pass filter shifting the operating frequency of said directional coupler to a lower frequency, said low pass filter having a filter response to flatten the coupling response outside of the usable band of the coupler, in turn, comprising:

a first inductor connected between the forward coupled port and the third port.

***Allowable Subject Matter***

Claims 1 – 6, 9 – 11 and 13 – 25 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of Hauer, Russell, Chaturvedi nor Kushitani teach or suggest the limitations of the claims and identified in Applicant's arguments as drawn to Fig. 7 (page 7). Hauer shows a circuit comprising generic block elements such as directional coupler (16) and low pass filter (30, 30'). Russell shows a specific circuit comprising a specific coupler (14) and low pass filter (22). Chaturvedi shows a multilayered coupler including vias and finally Kushitani shows a planar directional coupler and low pass filter using stubs where none of the prior art teaches or suggests the claimed limitations.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dean O. Takaoka whose telephone number is (571) 272-1772. The examiner can normally be reached on 8:30a - 5:00p Mon - Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pascal can be reached on (571) 272-1769. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2817

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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January 17, 2007